The Integrated Approach

OBJECTIVE

Work as a team towards the shared goal of a high-performance daylighted building.

- Share decisions and information across the entire design team from project conception through occupancy.

What is the Integrated Approach?

These Guidelines provide a concise reference for a design approach that emphasizes teamwork. A high performance, cost-effective, comfortably daylighted building requires the design team to practice integration:

- Adopt a holistic design approach, where the building is viewed as a whole and not just a collection of parts. Common practice often fails to address the critical interactions between the building facade (which admits heat and light) and the electric lighting system, resulting in an uncomfortable and inefficient building that is expensive and difficult to retrofit.
- Share appropriate decisions across disciplines.
- Regularly evaluate decisions for any building-wide ramifications.

What is a high-performance building?

One that

- Meets design objectives.
- Maximizes occupant comfort and productivity.
- Minimizes occupant complaints and tenant turnover.
- Maximizes building value to the owner.
- Yields a lifetime of energy efficiency and lower operating costs.

Why pursue daylighting?

Daylighting is the use of light from the sun and sky to complement or replace electric light. Appropriate fenestration and lighting controls are used to modulate daylight admittance and to reduce electric lighting, while meeting the occupants' lighting quality and quantity requirements. Daylighting is a beneficial design strategy for several reasons:

- Pleasant, comfortable daylighted spaces may increase occupant and owner satisfaction and may decrease absenteeism. Productive workers are a valuable business asset.
- Comfortable, pleasant, daylighted spaces may lease at better-than-average rates.
- Comfortable, pleasant spaces typically have lower tenant turnover rates.
- Lighting and its associated cooling energy use constitute 30 to 40% of a commercial building's total energy use. Daylighting is the most cost-effective strategy for targeting these uses. Both annual operating and mechanical system first costs can be substantially reduced.
- The Uniform Building Code, BOCA, and State Energy Codes regulate the "proper" use of windows in buildings.
- Energy-efficient buildings generally provide higher returns on developer investment and yield higher cash flows.
- Smart decisions up front save retrofit dollars later.
- Energy-efficient, daylighted buildings reduce adverse environmental impacts by reducing the use and need for power generating plants and their polluting by-products.
- Daylight contributes to a more sustainable design approach.

How do these guidelines work?

Quick tips, tools, and procedures are supplied here to point designers toward appropriate decisions and to help the design team stay focused on integration. Information is restricted to daylighting issues ; broader building concerns are left to the designers.

Twelve sections in these guidelines address the critical activities, from schematic design through occupancy, that influence daylighting performance. Each section contains specific design assistance with respect to that stage of design and flags important integration reminders.

Each section is formatted in the following manner:

Key Ideas

Lists design tips, rules of thumb, and other clear instructions.

Provisos

Notes particular exceptions from Key Ideas.

Integration Issues

Highlights any overlap for the design issues covered in this section. Where other design disciplines and goals will be affected by decisions made in this stage, a note is made across a matrix of six design concerns: Architectural Design; Interior Design; Heating, Ventilating and Air Conditioning (HVAC) System; Lighting System; Cost-effectiveness; and Occupant Comfort.

Tools and Resources

Lists ways to analyze decisions or other places to go for help. In some cases, quick calculation tools are provided.

Checklist

Gives a sequenced reminder of important steps in the section. Includes activity recommendations broken down by available time.

■ Getting Started

These Guidelines should function as a quick reference through all stages of design and building occupancy.

Pre-design, Programming

The goals established at this early planning stage will set the foundation for an integrated, comfortable, and energy-efficient building design. Establish performance goals together with the owner and make achieving these high performance goals a priority. Aim for an effective daylighting design. Establish schedule and budget parameters: more time available allows for more analysis; more budget allows for appropriate consultants. Use the easy tool in the COST/BENEFIT section to quickly determine if daylighting holds good investment potential. See the DAYLIGHT FEASIBILITY section to quickly check that daylighting makes sense for site and program.

Schematic Design

The first design decisions are critical to energy efficiency and daylighting. Get started on the right foot by reviewing Key Ideas in the ENVELOPE AND ROOM DECISIONS and SHADING STRATEGY sections. If you have not done so already, check DAYLIGHT FEASIBILITY and do a quick COST/BENEFIT analysis. LIGHTING, MECHANICAL, and CONTROLS sections should be browsed now.

Design Development

Refine envelope, room, and shading design. See ENVELOPE AND ROOM DECISIONS and SHADING STRATEGY for further detail and check the lists of *Tools and Resources* to improve design. See GLAZING SELECTION if not addressed yet. Sections on MECHANICAL COORDINATION and LIGHTING COORDINATION should now be viewed in detail, as should SENSORS AND CONTROLS. This is a critical time for coordination among design team members.

Construction Documents

Make sure glazing, shading, lighting, and control systems are properly specified. Include calibration, commissioning, and maintenance plans as part of the construction documents (review those sections now).

Pre-Occupancy

Review the CALIBRATION AND COMMISSIONING section in detail, and take appropriate action.

Post-Occupancy

Review MAINTENANCE section and keep it, along with the maintenance plan, on file in the building.